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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/775,896	02/02/2001	Eric R. Benson	14101-NN009	8160

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INTELLECTUAL PROPERTY LAW DEPARTMENT
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EXAMINER

HARTMAN JR, RONALD D

ART UNIT	PAPER NUMBER
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2121

DATE MAILED: 07/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/775,896	Applicant(s) BENSON ET AL.	
	Examiner Ronald D Hartman Jr.	Art Unit 2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8 and 11-15 is/are allowed.
- 6) ☒ Claim(s) 1-5, 9 and 10 is/are rejected.
- 7) ☒ Claim(s) 6-7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-15 are presented for further examination.

Response to Arguments

2. Applicant's arguments with respect to claims 1-15 have been fully considered but are moot in view of the new ground(s) of rejection, as set forth below in this office action.

Claim Objections

3. Claim 1, lines 10-11, "processing the sensor signal using..." is confusing since the new membership function is what is actually being processed, not the sensor signal itself. Furthermore, one of ordinary skill in the art would not know how to implement this limitation since the determination of "valid or not" is not adequately described by way of the pending claim.

Claim 3 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. All of the features of claim 3 are inherently disclosed by way of claim 1 since the scaling step already occurs, within the context of claim 1, before the processing step.

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Claim 5 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. All of the features of claim 5 are already adequately disclosed by way of pending claim 1, and the only discernable difference being the incorporation of the word "plurality" in regards to the inflection points of claim 5

Claim 6 is objected to because it does not adequately explain how the sensor's validity is actually determined. The claim ends by claiming changes are made to the membership function, but there is not sufficient claim language tying this concept to the preamble. The applicant is advised to adopt the claim language set forth in claims 1 and 9 with respect to a processing step for determining the validity of the signal.

Claim 7, step c, delete "foregoing" as its inclusion is unnecessary.

Claim 9 is replete with the same deficiencies as set forth by way of claim 1 above. That is, one of ordinary skill in the art would not know how to actually determine the validity of the sensor, using the newly formed membership function, based on the presented claim language.

Claim 10, "the collective degree of scatter" and "the individual degree of differences" lack proper antecedent basis. Furthermore, this claim also refers to a calculating step (step c) that is not disclosed in claim 9 and therefore this feature lacks proper antecedent basis.

Claim 12, "prior degrees of difference" lacks proper antecedent basis.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 9 is rejected under 35 U.S.C. 102(b) as being anticipated by Wu, U.S.

Patent No. 5,758,025.

As per claim 9, Wu teaches a fuzzy logic controller having:

- a sensor providing sequential signals (e.g. Figure 1 element 2; "xi" and C4 L26-31);
- a means of providing an estimated sensor signal and a means for determining the difference between the sensor signal and an estimated sensor signal (e.g. determining an error using Figure 1 elements 3-4 and C2 L53-55 and Figure 8 element 102; "error"); and

- a scaling or revising means to produce a new membership function and using the new membership function to determine whether the signal is operating in an acceptable or valid region (e.g. Figure 2 element 5, C6 L63-65 and C8 L11-28; "scaling factor" and Figure 2).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu, U.S. Patent No. 5,758,025, in view of Ejima et al., U.S. Patent No. 5,526,467.

As per claims 1 and 3, Wu teaches a fuzzy logic controller having:

- a sensor providing a signal (e.g. Figure 1 element 2; "xi");
- a means of providing an estimated sensor signal and a means for determining the difference between the sensor signal and an estimated sensor signal (e.g. determining an error using Figure 1 elements 3-4 and C2 L53-55 and Figure 8 element 102; "error"); and
- a scaling means to produce a new membership function and using the new membership function to determine whether the signal is operating in an acceptable or valid region (e.g. Figure 2 element 5, C6 L63-65 and C8 L11-28; "scaling factor" and Figure 2).

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As per claims 1 and 5, Wu does not specifically teach a scaling factor that is proportional to a standard deviation.

Ejima teaches that triangular membership functions may be represented in a Gaussian distribution by using a scaling factor that is a standard deviation so as to modify a traditional triangle membership function (e.g. C6 L22-38).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of Ejima into Wu because Gaussian membership functions use a wider range of non-zero truth-values that are needed to design an optimal approximation in a fuzzy logic system.

As per claim 2, a feature wherein the processing occurs before the scaling is a feature that is obvious since Wu teaches more than one cycle of data being processed (e.g. C4 L27-31), and therefore this feature is adequately disclosed by Wu.

As per claim 4, Wu teaches the membership function having at least two domains representing acceptable and unacceptable regions of operation (e.g. Figures 2 and 5-7).

As per claim 10, Wu does not specifically teach the determination of scatter.

Ejima teaches the use of a standard deviation, which is known in the art to represent the amount or degree of scatter, and is used for scaling a membership function (e.g. C6 L22-38).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of Ejima into Wu because Gaussian membership functions use a wider range of non-zero truth-values that are needed in order to more accurately design an optimal approximation in a fuzzy logic system.

Allowable Subject Matter

6. Claims 6-8 are allowed.

As per claims 6-8, specifically independent claim 6, the prior art of record fails to teach or adequately suggest a method for determining the validity of a sensor in a fuzzy logic controller, wherein the method includes providing a first cumulative scatter value and deriving the x-axis values of a membership function using the first cumulative scatter value. Furthermore, the method then uses a further scatter value, which is determined based on the degree of difference between a further sensor signal and a further estimated sensor signal, wherein the further scatter value is combined with the first cumulative scatter value in order to produce a second scatter value. This second scatter value is then used to amend or modify the fuzzy logic membership function so as to provide x-axis values that are derived from the second cumulative scatter value, in combination with the other claimed features and or limitations as claimed by the claimed invention.

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Claims 11-15 are objected to as being dependent upon rejected base claim (claim 9), but would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims (claim 10).

As per claims 11-15, specifically claim 11, the prior art of record fails to teach or adequately suggest a method for determining the validity of sequential sensor values, wherein a standard deviation is calculated after each error determination step, wherein the value of the collective degree of scatter incorporates all of the previous individual degrees of difference, in combination with the other claimed feature and or limitations as claimed by the claimed invention.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ronald D Hartman Jr. whose telephone number is 703-308-7001. The examiner can normally be reached on Mon. - Fri., 11:30 am - 8:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight, can be reached on 703-308-3179. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ronald D Hartman Jr.
Examiner
Art Unit 2121



Anthony Knight
Supervisory Patent Examiner
Group 3600